DIVISION OF ENVIRONMENT
QUALITY MANAGEMENT PLAN

PART III:

AMBIENT AIR CRITERIA POLLUTANTS MONITORING PROGRAM
QUALITY ASSURANCE PROGRAM PLAN

Revision 2
March 31, 2009

Kansas Department of Health and Environment
Division of Environment
Bureau of Air and Radiation
Monitoring and Planning Section
1000 SW Jackson, Suite 310
Topeka, Kansas 66612-1366

Approvals

KDHE Division of Environment

Name: Scott Weir
Title: Air Monitoring Unit Supervisor

Signature_____ Date_____

Name: Douglas Watson
Title: Planning and Data Unit Supervisor

Signature_____ Date_____

Name: Tom Gross
Title: Chief, Monitoring and Planning Section

Signature_____ Date_____

Name: Jim Stewart
Title: Bureau Quality Assurance Representative

Signature_____ Date_____

Name: Rick Brunetti
Title: Director, Bureau of Air and Radiation

Signature_____ Date_____

Name: Marian Massoth
Title: Quality Assurance Officer, Division of Environment

Signature_____ Date_____

TABLE OF CONTENTS

Section 1

OVERVIEW

1.1 Purpose and Scope

This document is the Quality Assurance (QA) Program Plan (QAPP) for Ambient Air Criteria Pollutant Monitoring, administered by the Air Monitoring Unit (AMU) and the Planning and Data Unit of the Monitoring and Planning Section (MPS), Bureau of Air and Radiation (BAR), Division of Environment (DoE), Kansas Department of Health and Environment (KDHE). The purpose of the QAPP is to define and document the QA and quality control (QC) activities of the program and ensure the validity of all data produced in the course of operations. Where applicable, this QAPP references the MPS Ambient Air Monitoring Standard Operating Procedures (AAM SOP).

The provisions of this QAPP apply to ambient air criteria pollutant monitoring conducted by MPS. The QAPP also applies to criteria pollutant monitoring performed by two local health/environment departments which submit data to MPS for review and forwarding to the United States Environmental Protection Agency (EPA).

1.2 Developmental History of Plan

On May 10, 1979, EPA promulgated regulations in 40 CFR 58 that specified monitoring requirements for State Implementation Plans (SIPs). These regulations also set forth requirements made in response to Section 319 of the Clean Air Act Amendments of 1977 which required EPA to establish monitoring criteria to be applied uniformly across the nation, and to establish a national monitoring network. One of the requirements of the regulations is that organizations responsible for ambient air pollution monitoring must establish and maintain a viable QA/QC program. Appendix A of 40 CFR 58 describes such requirements for organizations responsible for SLAMS. Appendix B of 40 CFR 58 describes requirements for organizations responsible for prevention of significant deterioration (PSD) air monitoring. These requirements include development and implementation of policies, procedures, specifications, standards, and documentation necessary to (1) provide data of adequate quality to meet monitoring objectives and (2) minimize loss of air quality data due to malfunctions or out-of-control conditions.

The Monitoring and Planning Section has maintained an approved QA management plan and associated SOPs, in accordance with 40 CFR 58, since March 23, 1982. In 1995 revision and reformatting of the plan was carried out in compliance with an effort by the KDHE/DoE to consolidate program QA management plans and SOPs into a standard format. In 1999, a $PM_{2.5}$

QAPP was written and approved by EPA for the commencement of a new statewide $PM_{2.5}$ monitoring program. In 2000 this QAPP was written to replace the 1995 plan and the 1999 $PM_{2.5}$ QAPP. The Ambient Air Monitoring Regulations were revised by EPA in 2006, and the current document reflects updates and revisions made as a result of a comprehensive review conducted during 2007-08.

1.3 Historical Overview of Program

The Kansas ambient air quality monitoring program was initially authorized for implementation by KDHE (formerly the Kansas State Board of Health) with the enactment of K.S.A. 65-3001 *et seq.* by the 1967 Kansas legislature. The major provisions of these enabling statutes were adopted to simultaneously comply with the requirements of the federal Clean Air Act (42 U.S.C. 1857), which was subsequently amended in 1967, 1970, 1977 and 1990. This federal law establishes the requirements for states to implement approved air pollution control programs within their respective jurisdictions. The initial series of comprehensive air pollution control regulations implementing the Kansas Air Quality Act were promulgated in 1970 and codified in Article 19 of KDHE's administrative regulations (K.A.R. 28-19-1 *et seq.*). These original regulations have been amended and expanded since that time to comply with relevant modifications to the federal requirements and to respond to changing needs within the state.

1.4 Operational Overview

The ambient air criteria pollutant monitoring program conducted by MPS generates a large quantity of data from hourly (continuous) and daily (intermittent) monitoring instruments located across the state. The Kansas Ambient Air Monitoring Network and associated air quality surveillance activities are described in the State of Kansas Implementation Plan for the Attainment and Maintenance of National Air Quality Standards, Section E – Monitoring Plan. Air monitoring data obtained from MPS activities are reported on a quarterly basis to the Air Quality System (AQS), a national database maintained by EPA.

Section 2

ORGANIZATIONAL DESCRIPTION

2.1 Organizational Charts

40 CFR Part 58 defines a State Agency as "the air pollution control agency primarily responsible for the development and implementation of a plan [State Implementation Plan (SIP)] under the Act [Clean Air Act]". The Kansas Department of Health and Environment (KDHE) is the State Agency for Kansas.

40 CFR Part 58 defines the Local Agency as "any local government agency, other than the State agency, which is charged by a State with the responsibility for carrying out a portion of the plan [SIP]". The following are the Local Agencies in Kansas:

Wichita Department of Environmental Services (WDES)
Unified Government of Wyandotte County - Kansas City, Kansas (UGWC-KCK)

Figure 2.1 through 2.3 below represent the organizational structures of those portions of KDHE and the two local agencies which are responsible for the activities of the ambient air criteria pollutant monitoring program.

Kansas Department of Health and Environment
Division of Environment
Bureau of Air and Radiation
Ambient Air Monitoring Organizational Structure

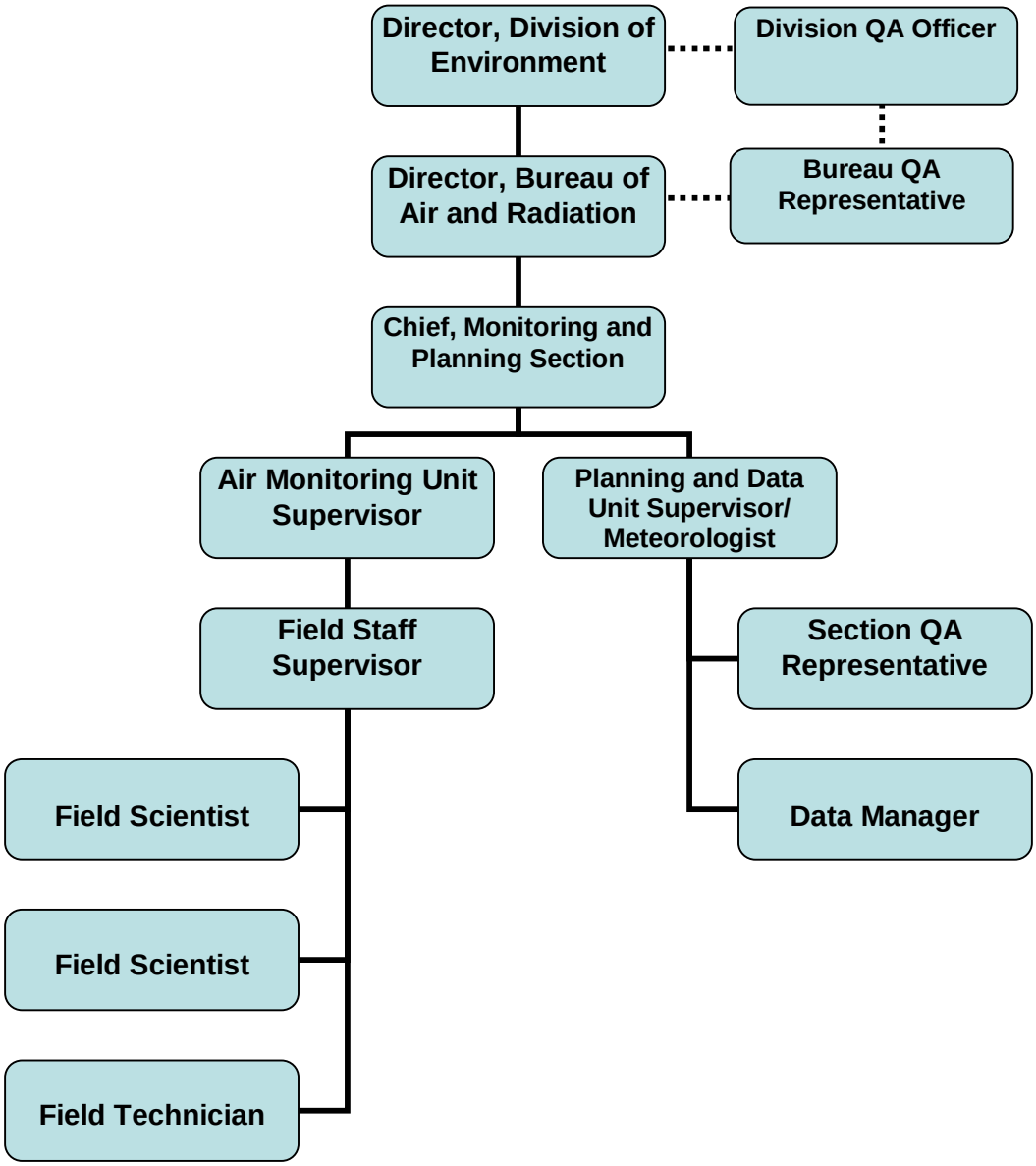

Figure 2.1

Wichita Department of Environmental Services

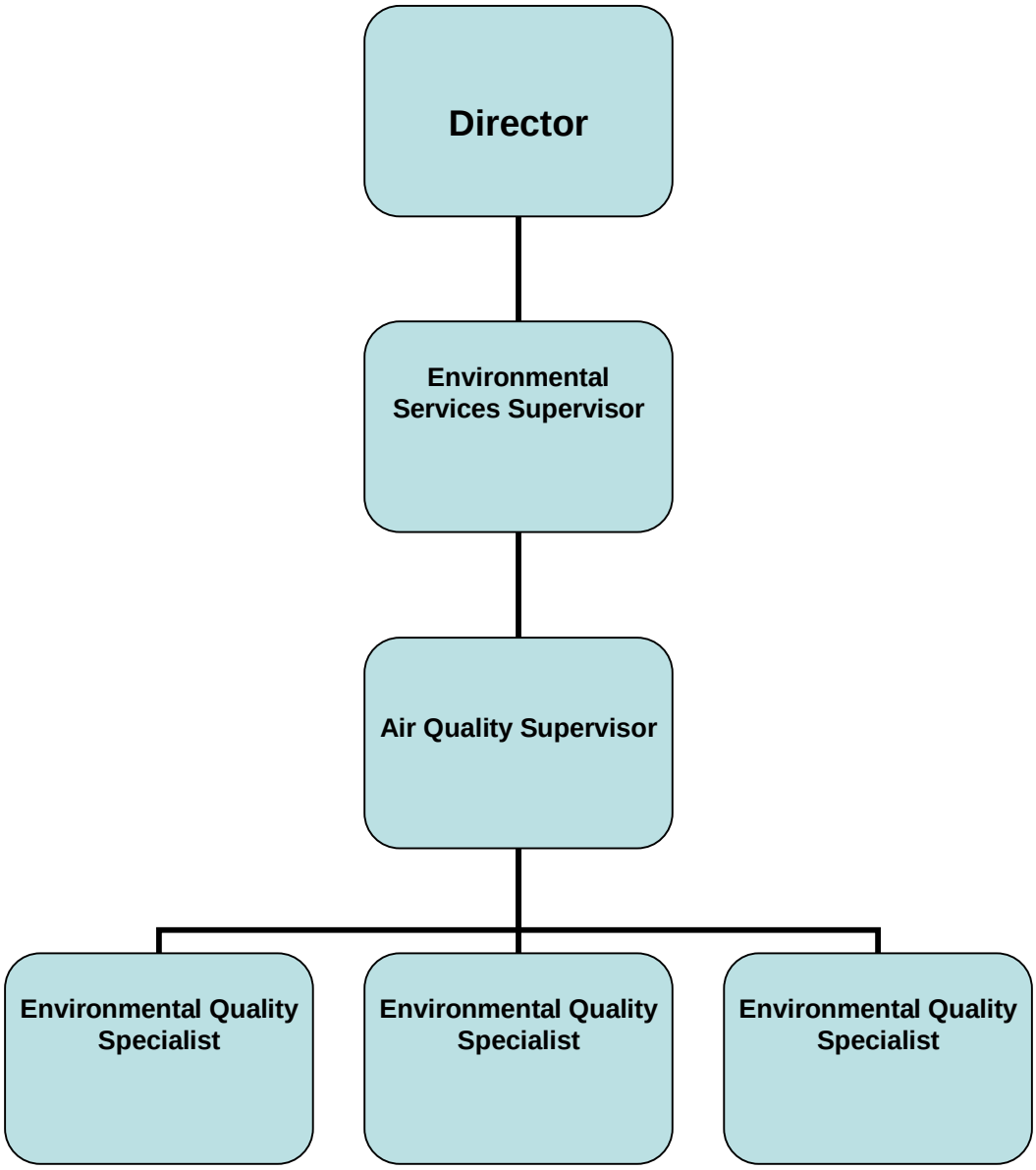

Figure 2.2

Unified Government of Wyandotte County – Kansas City, Kansas Department of Air Quality

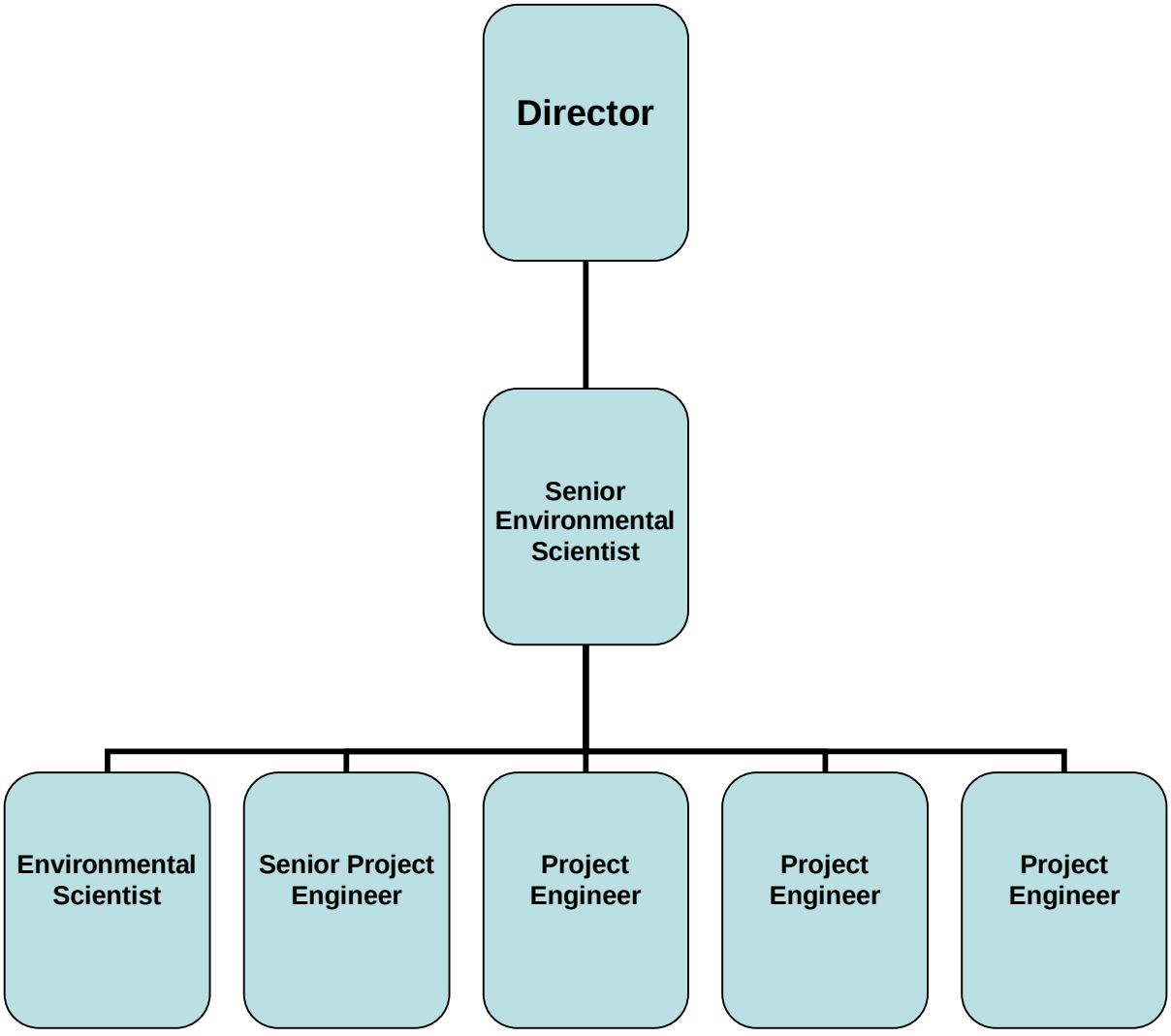

Figure 2.3

2.2 Individual Responsibilities of the Kansas Department of Health and Environment (KDHE)

The QA responsibilities of the **Division of Environment Director** and the **Division QA Officer** are described in the Division of Environment Quality Management Plan (QMP) Part I, Section 3.2.

The **Bureau Director** of the Bureau of Air and Radiation has overall responsibility for managing the Bureau of Air and Radiation (BAR) according to Division of Environment policy. The direct responsibility for assuring data quality rests with line management. Ultimately, the Bureau Director is responsible for establishing QA policy and for resolving QA issues identified through the QA program. Major QA related responsibilities of the Bureau Director include:

- approving the budget and planning processes
- assuring that the BAR develops and maintains a current and germane quality system
- assuring that the BAR develops and maintains current QAPPs and ensures adherence to the documents by staff, and where appropriate, other extramural cooperators
- establishing policies to ensure that QA requirements are incorporated into all environmental monitoring operations
- maintaining an active line of communication with the QA and scientific/technical managers

The Bureau Director delegates the responsibility of QA development and implementation in accordance with Division of Environment policy to the Section Chiefs.

The **Section Chief of the Monitoring and Planning Section** has overall responsibility for managing the Monitoring and Planning Section of the Bureau of Air and Radiation (BAR). The direct responsibility for assuring data quality rests with line management. Ultimately, the Section Chief is responsible for establishing QA policy and for resolving QA issues identified through the QA program. Major QA related responsibilities of the Section Chief include:

- participating in the budget and planning processes
- assuring that the Section develops and maintains a current and germane quality system
- assuring that the Section develops and maintains current QAPPs and ensuring adherence to the document by staff, and where appropriate, other extramural cooperators
- carrying out policies to ensure that QA requirements are incorporated into all environmental monitoring operations
- maintaining an active line of communication with the QA and scientific/technical managers
- communicating with EPA Project Officers and EPA QA personnel on issues related to routine sampling and QA activities
- understanding EPA monitoring and QA regulations and guidance, and ensuring subordinates understand and follow these regulations and guidance

- understanding KDHE QA policy and ensuring subordinates understand and follow the policy
- understanding and ensuring adherence to the QAPPs
- reviewing acquisition packages (contracts, grants, cooperative agreements, inter-agency agreements) to determine the necessary QA requirements.
- reviewing and approving QAPPs for the Ambient Air Monitoring Program
- developing budgets and providing program costs necessary for EPA allocation activities
- ensuring that all personnel involved in environmental data collection have access to any training or QA information needed to be knowledgeable in QA requirements, protocols, and technology
- recommending required management-level corrective actions

The Section Chief delegates the responsibility of QA development and implementation in accordance with BAR policy to those in the Monitoring and Planning Section.

The Bureau QA Representitive (BQAR) of the Bureau of Air and Radiation is the official staff QA contact appointed by the Bureau Director. The BQAR reviews and approves all QAPPs within the bureau. The BQAR is responsible for the QA aspects of the Ambient Air Quality Monitoring Program. The BQAR's responsibilities include:

- remaining current on KDHE/DoE QA policy and general and specific EPA QA policies and regulations as it relates to the Ambient Air Quality Monitoring Program
- developing, reviewing and approving QAPPs for the Ambient Air Monitoring Program
- responding to technical systems audits conducted by EPA
- providing QA training to scientific/technical staff of the section
- reviewing air monitoring standard operating procedures (SOPs).
- ensuring timely follow-up and corrective actions resulting from auditing and evaluation activities
- verifying that the measurement quality standards are met as stated in the QAPPs

The **Planning and Data Unit Supervisor** (PDUS) directs the activities of the Planning and Data Unit (PDU). The PDUS is responsible for coordinating the data management activities of the ambient air monitoring program and directly supervises the Data Manager (DM) and Section Quality Assurance Representative (SQAR). Responsibilities of the PDUS include:

- participating in the development and implementation of QAPPs
- participating in training and certification activities as trainer and trainee
- participating in the development of data quality requirements (overall and field) with the AMUS, Data Manager, SQAR and Bureau QA Representative
- participating in the development of standard operating procedures (SOPs)
- verifying that all required QA/QC activities are performed

The **Data Manager** (DM) is responsible for ensuring that data and information collected for the air monitoring program are properly captured, stored, and transmitted for use by program participants. The DM also provides data reports, calculations, and charts as requested. Responsibilities include:

- developing data management standard operating procedures
- ensuring that information management activities are developed within reasonable time frames for review and approval
- following good automated data processes
- coordinating the development of the information management system with data users
- ensuring the development of data standards for data structure, entry, transfer, and archive
- ensuring the adherence to the QAPPs where applicable
- ensuring access to data for timely reporting and interpretation processes
- ensuring the development of database guides (database structures, user guidance documents)
- ensuring timely delivery of all required data to the EPA-AQS system
- reviewing precision and bias data
- determining appropriate exceptional event or validity flags in EPA-AQS

The **Meteorologist** acquires and manages meteorological data from 29 weather stations in and around Kansas. He/she analyzes air pollution data with respect to meteorological data. This analysis includes study of long range transport and local sources of air pollution. The meteorologist coordinates and edits the Annual Report for distribution to the public.

The **Section Quality Assurance Representative** (SQAR) aids the BQAR in his/her responsibilities (see above). Responsibilities include:

- participating in the development and implementation of QAPPs
- providing QA/QC training to BAR staff
- participating in the development of data quality requirements (overall and field) with the Data Manager and Bureau QA Representative
- participating in the development of standard operating procedures (SOPs)
- verifying that all required QA/QC activities are performed
- ensuring that all manufacturer's operating guidelines are followed
- ensuring that preventive maintenance is performed and documented
- ensuring that deviations from established procedures and methods are documented
- reporting all problems and corrective actions to the Section Chief and the Data Manager
- reporting observed field/handling conditions which might influence data validity to the Data Manager

The **Air Monitoring Unit Supervisor** (AMUS) directs the activities of the Air Monitoring Unit (AMU). The AMU is responsible for carrying out air monitoring and ensuring the data

quality results of the air monitoring by adhering to guidance and protocol specified by the QAPPs and SOPs for the field activities. Responsibilities of the AMUS include:

- participating in the development and implementation of QAPPs
- participating in training and certification activities as trainer and trainee
- participating in the development of data quality requirements (overall and field) with the Data Manager, PDUS, SQAR and Bureau QA Representative
- participating in the development of standard operating procedures (SOPs)
- verifying that all required QA/QC activities are performed
- ensuring that all manufacturer's operating guidelines are followed
- ensuring that preventive maintenance is performed and documented
- ensuring that deviations from established procedures and methods are documented
- reporting all problems and corrective actions to the Section Chief and the Data Manager
- reporting observed field/handling conditions which might influence data validity to the Data Manager
- preparing and delivering field data to the Data Manager

The AMUS prepares and negotiates the contract with the laboratory for $PM_{2.5}$ analysis. The AMUS is also the point of contact with the $PM_{2.5}$ Laboratory.

The **Field Staff Supervisor** (FSS) supervises the field staff who are responsible for carrying out air monitoring and ensuring the data quality results of the air monitoring by adhering to guidance and protocol specified by the QAPPs and SOPs for the field activities. Responsibilities include:

- reviewing and implementing the Air Monitoring QAPPs
- participating in training and certification activities
- participating in the development and modification of SOPs
- verifying that all required QA/QC activities are performed as required in the QAPPs
- ensuring that all manufacturer's operating guidelines are followed
- ensuring that preventive maintenance is performed and documented
- documenting deviations from established procedures and methods
- reporting all problems and corrective actions to the AMUS
- reporting observed field/handling conditions which might influence data validity
- preparing and delivering field data to the Data Manager, SQAR or AMUS
- shipping/receiving equipment and filters according to the QAPPs
- preparing purchase requests and approvals for new equipment, parts and repairs
- providing technical assistance to local agency staff for equipment/operational issues

The **Field Staff** are responsible for carrying out air monitoring and ensuring the data quality results of the air monitoring by adhering to guidance and protocol specified by the QAPPs

and SOPs for the field activities. Responsibilities include:

C reviewing and implementing the Air Monitoring QAPPs
C participating in training and certification activities
C participating in the development and modification of SOPs
C performing all required QA/QC activities as required in the QAPPs
C following all manufacturer's operating guidelines
C performing and documenting preventive maintenance
C documenting deviations from established procedures and methods
C reporting all problems and corrective actions to the FTS
C reporting observed field/handling conditions which might influence data validity
C preparing and delivering field data to the Data Manager or AMUS
C shipping/receiving equipment and filters according to the QAPPs
C providing operational training and technical assistance to local agencies

2.3 Individual Responsibilities of the Wichita Department of Environmental Services

The **Environmental Services Director** is responsible for all aspects of environmental health of the Wichita Department of Environmental Health.

The **Environmental Services Supervisor** supervises work in the administration of environmental services, including, but not limited to, air quality, public health sanitation, animal control, food inspection, adult care, vector control, and/or hazardous waste programs.

The **Air Quality Program Supervisor** (AQPS) is responsible for planning, coordinating and supervising a comprehensive program of air pollution prevention and control, including participation in the inspection, surveillance and eradication of sources of air pollution. The AQPS will report any problems or corrective actions to KDHE.

The **Environmental Quality Specialists** (EQS) are responsible for carrying out air monitoring and ensuring the data quality results of the air monitoring by adhering to guidance and protocol specified by the QAPPs and SOPs for the field activities. Responsibilities include:

C reviewing and implementing the Air Monitoring QAPPs
C participating in training and certification activities
C participating in the development and modification of SOPs
C performing all required QA/QC activities as required in the QAPPs
C following all manufacturer's operating guidelines
C performing and documenting preventive maintenance
C documenting deviations from established procedures and methods
C reporting all problems and corrective actions to the AQPS
C reporting observed field/handling conditions which might influence data validity

C preparing and delivering field data to the Data Manager or AMUS
C shipping/receiving equipment and filters according to the QAPPs

2.4 Individual Responsibilities of the Unified Government of Wyandotte County - Kansas City, Kansas

The **Director Department of Air Quality** (DDAQ) is the chief administrator of the Department of Air Quality of the Unified Government of Wyandotte County - Kansas City, Kansas.

The **Senior Environmental Scientist** (SES) supervises the air pollution activities (including air monitoring). The ES II reports any problems or corrective actions to KDHE.

The **Environmental Scientist** and **Project Engineers** are responsible for carrying out air monitoring and ensuring the data quality results of the air monitoring by adhering to guidance and protocol specified by the QAPPs and SOPs for the field activities. Except for the Environmental Scientist, these people act in a backup role for air monitoring. Responsibilities include:

C reviewing and implementing the Air Monitoring QAPPs
C participating in training and certification activities
C participating in the development and modification of SOPs
C performing all required QA/QC activities as required in the QAPPs
C following all manufacturer's operating guidelines
C performing and documenting preventive maintenance
C documenting deviations from established procedures and methods
C reporting all problems and corrective actions to the SES
C reporting observed field/handling conditions which might influence data validity
C preparing and delivering field data to the Data Manager or AMUS
C shipping/receiving equipment and filters according to the QAPPs

2.5 Distribution

This document, the Ambient Air Criteria Pollutant Monitoring QAPPs and any revisions will be distributed to:

KDHE Division of Environment QA Officer
KDHE Bureau of Air and Radiation (BAR) Director
KDHE Bureau of Air and Radiation (BAR) QA Representative
KDHE BAR Monitoring and Planning Section (MPS) Section Chief
KDHE BAR MPS Data and Planning Unit Supervisor
KDHE BAR MPS Air Monitoring Unit Supervisor
KDHE BAR MPS Field Staff Supervisor

KDHE BAR MPS Field Staff
KDHE BAR MPS Section QA Representative
Wichita Department of Environmental Services
Unified Government of Wyandotte County - Kansas City, Kansas, Department of Air Quality
United States Environmental Protection Agency, Region 7

Section 3

DATA PERFORMANCE CRITERIA

This section provides a description of data performance criteria expressed in terms of data precision, accuracy, completeness, comparability and representativeness for each parameter of interest.

3.1 Precision

Precision is defined as the level of agreement among individual measurements of the same property, conducted under identical or similar conditions. The precision of each monitor is found in the following manner.

3.1.1 $PM_{2.5}$/PM_{10} Intermittent Monitoring

To the nearest whole number, at least 15% of the $PM_{2.5}$ monitors and 15% of the PM_{10} monitors are collocated. Collocated monitors are those which measure the same parameter and run simultaneously every six days at the same site. Continuous PM samplers may be used as collocated samplers. (Note: Operation of collocated monitors will be reduced to every twelve days if funding becomes an issue.) See the document Ambient Air Monitoring Standard Operating Procedures (AAM SOP) Sections 2 and 9 for the details of these procedures.

Each $PM_{2.5}$ sequential monitor is checked once each month to verify normal monitor air flow rate, temperature sensor response, and barometric pressure sensor response. These checks are called verifications and are performed each month by the operator of the monitor. See AAM SOP Section 9 for the details of this procedure.

Each PM_{10} Hi-Vol sampler is checked once each calendar quarter to verify normal monitor air flow rate.

3.1.2 $PM_{2.5}$/PM_{10} Continuous Monitoring

To the nearest whole number, at least 15% of the $PM_{2.5}$ monitors and 15% of the PM_{10} monitors are collocated. Collocated monitors are those which measure the same parameter and run simultaneously every six days at the same site. (Note: Operation of collocated monitors will be reduced to every twelve days if funding becomes an issue.) FRM $PM_{2.5}$ and manual PM_{10} samplers may be used as collocated samplers.

Once every four weeks, a flow check is performed at the normal flow rate of the monitor. See AAM SOP Section 14 for details of this procedure.

3.1.3 Gaseous Monitors Except CO

Every two weeks, the monitors are exposed to a known concentration from 0.08 to 0.10 parts per million (ppm). The known concentration and the monitor reading are recorded. See AAM SOP Section 1 for details of this procedure.

3.1.4 CO

Every two weeks, the monitors are exposed to a known concentration from 8 to 10 parts per million (ppm). The known concentration and the monitor reading are recorded. See Section 1 of AAM SOP for details of this procedure.

3.1.5 Evaluation of precision

In the case of filter monitors, precision is evaluated by calculating the percent difference between the collocated readings. In the case of continuous monitors, precision is evaluated by calculating the percent difference between the known reading and the monitor reading. An absolute value of the percent difference (APD) of more than 15% indicates a problem. An exception to this is with collocated concentrations which are low. That is, where either collocated $PM_{2.5}$ concentration is less than 3 ug/m^3, an APD of more than 15% is not considered a problem. Also, where either collocated PM_{10} or collocated TSP concentration is less than 15 ug/m^3, an APD of more than 15% is not considered a problem.

The problem situations will be examined and a solution will be found to correct the problem. All precision results (except $PM_{2.5}$ and PM_{10} verifications) will be reported to EPA-AQS on a quarterly basis (within 90 days of the end of the calendar quarter). See AAM SOP Section 4 for details of this procedure.

3.2 Accuracy

Accuracy is defined as the extent to which a measured value actually represents the condition being measured. Accuracy is influenced by the degree of random error (precision) and systematic error (bias) inherent in the measurement operation (e.g., environmental sampling and analytical operations). The accuracy of each monitor is found in the following manner.

3.2.1 $PM_{2.5}$ Intermittent Monitors

Single point flow audits will be conducted on each monitor once every six months. The flow standard used for the audit will be different than the flow standard used for calibration of the

monitor. See Section 9 of AAM SOP for details of this procedure.

Each year, EPA will designate monitors on which to perform collocated reference method (FRM) audits. Each designated monitor will be audited by EPA (or its contractor) four days during the year. Eight (8) valid audits should be obtained each year, and all samplers should be audited within six (6) years.

3.2.2 PM_{10} Intermittent Monitors

Each sampler will be audited with a single point flow check every 6 months. The flow standard used for the audit will be different than the flow standard used for calibration of the monitor. See AAM SOP Section 2 for details of this procedure.

[Note: No collocated EPA audits of PM_{10} monitors are required.]

3.2.3 $PM_{2.5}$/PM_{10} Continuous Monitors

Each monitor will be audited with a single point flow check every 6 months. The flow standard used for the audit will be different than the flow standard used for calibration of the monitor. See AAM SOP Section 14 for details of this procedure.

Each year, EPA will designate continuous $PM_{2.5}$ monitors on which to perform collocated audits. Each designated monitor will be audited by EPA (or its contractor) four days during the year. Eight (8) valid audits should be obtained each year, and all samplers should be audited within six (6) years.

[Note: No collocated EPA audits of PM_{10} monitors are required.]

3.2.4 Gaseous Monitors Except CO

For each pollutant, at least one and at least 25% of the monitors will be audited at three known concentrations (0.03 to 0.08 ppm, 0.15 to 0.20 ppm, and 0.35 to 0.45 ppm) each calendar quarter. Each monitor will be audited at least once a year. The gaseous standards used for the audit will be different than the gaseous standards used for calibration of the monitor. See AAM SOP Section 1 for details of this procedure.

3.2.5 CO Monitors

At least one and at least 25% of the monitors will be audited at three known concentrations (3 to 8 ppm, 15 to 20 ppm, and 35 to 45 ppm) each calendar quarter. Each monitor will be audited at least once a year. The gaseous standards used for the audit will be different than the gaseous standards used for calibration of the monitor. See AAM SOP Section 1 for details of this procedure.

3.2.6 Evaluation of accuracy

Accuracy of the monitors is evaluated by calculating the absolute value of the percent difference (APD) between the known concentration or known flow and the monitor reading. For flow audits on $PM_{2.5}$ filter monitors, an APD of greater than 4% indicates a problem. For flow audits of PM_{10} filter monitors and TSP monitors, an APD of greater than 10% indicates a problem. For other monitors, an APD of greater than 15% indicates a problem.

The problem situations will be examined and a solution will be found to correct the problem. All accuracy results will be reported to EPA-AQS on a quarterly basis (within 90 days of the end of the calendar quarter). See AAM SOP Section 4 for details of this procedure.

3.3 Completeness

Completeness is defined as a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions.

Our minimum requirement is 75% valid data at each monitor per calendar quarter. Our goal is 100% valid data at each monitor per calendar quarter. The percentage valid is based on only those days which are planned to be monitored. In the case of particulate matter monitoring which is scheduled for less then every day sampling, monitoring on a non-scheduled day does not count as valid when calculating the percent valid.

3.4 Comparability

Comparability is defined as a measure of the confidence with which one item (e.g., data set) can be compared to another. We achieve comparability by using methodology which has been approved by EPA. Specifically, EPA has established certain monitoring equipment as reference or equivalent methods (REM). Unless the monitored parameter has no REM, we use the REM for monitoring.

3.5 Representativeness

Representativeness is defined as a measure of the degree to which data accurately and precisely represent a selected characteristic of a monitored system. Representativeness is achieved through the accuracy and precision procedures described above in sections 3.2 and 3.1 respectively.

KDHE also achieves representativeness by following 40 CFR Part 58, Appendix D (Network Design for State and Local Air Monitoring Stations (SLAMS), National Air Monitoring Stations (NAMS), and Photochemical Assessment Monitoring Stations (PAMS)) and 40 CFR

Part 58, Appendix E (Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring).

Each monitor operated by KDHE is assigned a scale of representativeness based on the definitions of 40 CFR Part 58, Appendix D.

Microscale defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.

Middle Scale defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.

Neighborhood Scale defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range.

Urban Scale defines the overall, citywide conditions with dimensions on the order of 4 to 50 kilometers. This scale would usually require more than one site for definition.

Regional Scale defines usually a rural area of reasonably homogeneous geography and extends for tens to hundreds of kilometers.

Section 4

NETWORK DESCRIPTION

4.1 Purpose

The purpose of this section to provide a description of, and rationale for, intended sampling frequency, sampling network design and monitoring site selection criteria.

The primary purpose of the KDHE air monitoring program is to measure compliance with the National Ambient Air Quality Standards (NAAQS). Other purposes include determining trends over time, determining effects on air quality from adjustments to source emissions, developing algorithms based on historical air quality and other conditions which will forecast air quality, verifying air quality modeling programs, providing real-time ozone data to the public, and correlating health effects to air quality.

Sampling network design and monitoring site selection comply with the following Appendices to 40 CFR Part 58:

(1) 40 CFR 58, Appendix A contains QA criteria;

(2) 40 CFR 58, Appendix D contains criteria for network design; and

(3) 40 CFR 58, Appendix E contains criteria for siting of instruments and/or instrument probes.

4.2 Sampling Frequency

Minimum sampling frequencies are established by EPA and followed accordingly. The sampling frequency of the KDHE monitors is based on EPA's requirement. In the cases of every third and sixth day sampling, specific days must be sampled in order that the entire nation is sampling on the same day. This intermittent sampling is accomplished in accordance with a national sampling schedule published annually by EPA.

4.3 Site Selection

The selection of a specific monitoring site includes the following activities:

1) developing and understanding the monitoring objective and appropriate data quality objectives;

2) identifying the spatial scale most appropriate for the monitoring objective of the site;

3) identifying general potential locations where the monitoring site could be placed; and

4) identifying the specific monitoring site.

4.4 Monitoring Objectives and Spatial Scales

The criteria pollutant component of the Kansas Ambient Air Monitoring Network is designed to determine one of six monitoring objectives:

1) highest concentrations expected to occur in the area covered by the network;

2) representative concentrations in areas of high population density;

3) impact on ambient air pollution of significant sources;

4) general background concentration levels;

5) extent of regional pollutant transport among populated areas, and in support of secondary standards; and

6) welfare-related impacts in rural and relatively remote areas.

Each monitor within the Kansas Ambient Air Monitoring Network (see tables below) is assigned one of the following monitoring objective designations:

Population exposure	The monitor located in an area associated with high population density.
Background	The monitor is located where manmade pollutant emissions are minimal.
Precision	This monitor is collocated for quality control purposes, i.e., to provide duplicate data for the evaluation of measurement precision.
Transport	The monitor is located to measure pollutants transported from other areas.

Maximum concentration	The monitor is located where a high concentration of the pollutant is expected (often based on results of receptor models).
Comparison study	The monitor is located adjacent to other instrumentation measuring the same pollutant to compare different sampling/monitoring methodologies.
AQI	The monitor provides data primarily for reporting the Air Quality Index (previously called the Pollutant Standards Index).

Data collected within the network must be representative of the spatial area under study. The goal in siting a monitoring station is to match the spatial scale represented by the samples obtained with the spatial scale most appropriate for the monitoring objective of the station. For a description of representative measurement scales, see section 3.5 above.

4.5 Site Location

Four criteria should be considered when evaluating potential sites. Monitoring sites should be oriented to measure the following (singly or in combination as appropriate for the sampling objective):

1) impacts of known pollutant emission categories on air quality;

2) population density relative to receptor-dose levels, both short- and long-term;

3) impacts of known pollutant emission sources (area and point) on air quality; and

4) representative air quality.

Selection according to these criteria requires detailed information concerning the location of sources, geographical variability of ambient pollutant concentrations, meteorological conditions and population density. Selection of the number, geographic locations, and types of sampling stations is, therefore, a complex process.

The sampling site selection process also involves consideration of the following factors:

Economics	The level of resources required for all data collection activity. This includes instrumentation, installation, maintenance, data retrieval, data analysis, quality assurance and data interpretation.

Security — In some cases, a particular site may have associated problems which compromise the security of monitoring equipment (i.e., high risk of theft, vandalism, etc.). If such problems cannot be remedied through the use of standard measures such as additional lighting, fencing, etc., then an attempt to locate the site as near as possible to the preferred location shall be made.

Logistics — This process includes procurement, maintenance and transportation of material and personnel for the monitoring operation. The logistics process requires full knowledge of all aspects of the data collection operation: planning, reconnaissance, training, scheduling, safety, staffing, procurement of goods and services, communications, and inventory management.

Atmospheric considerations — These may include spatial and temporal variability of pollutants and their transport. Effects of buildings, terrain, and heat sources or sinks on air trajectories can produce localized anomalies of pollutant concentrations. Meteorology must be considered in determining the geographic location of a site as well as the height, direction and extension of sampling probes. Evaluation of a local wind rose is essential to proper location of many monitoring sites (e.g., siting either to detect or avoid emissions from specific sources).

Diffusion and transport of air pollutants are affected by topographic features. Minor features may exert small influences, and major features (e.g., deep river valleys or mountain ranges) can affect large areas. A review of topography should be conducted prior to final site selection to ensure that data collection will not be adversely affected.

4.6 Monitor Placement

Final placement of a particular monitor at a selected site is dependent on physical obstructions and activities in the immediate area. The availability of utilities (i.e., electricity and telephone services) is critical. Monitors must be placed away from obstructions such as trees and fences in order to avoid their effects on air flow. To prevent sampling bias, air flow around the monitor sampling probe must be representative of the general air flow in the area.

The placement of each monitor is generally determined by the defined monitoring objective. Monitors are thus usually placed according to potential exposure to pollution. Due to the various factors discussed above, tradeoffs are often necessary to locate a site for collection of optimally representative data.

4.7 Network Information

Kansas Ambient Air Quality Monitoring Network site descriptions and other relevant site information are maintained in a file at the offices of KDHE/BAR. A table providing an overview of the current network is also maintained by the AMU, and copies can be provided to the public upon request.

Section 5

DESCRIPTION OF SAMPLING EQUIPMENT

5.1 Description of Sampling Equipment

Descriptions of the sampling equipment and associated decontamination procedures are provided in the Ambient Air Monitoring (AAM) SOPs. If the pollutant monitored has United States Environmental Protection Agency Reference or Equivalent Methods (REM), then one of those REM will be used by KDHE for air monitoring.

Section 6

DESCRIPTION OF FIELD PROCEDURES

6.1 Description of Field Procedures

A description of field procedures, including sample collection, analysis, preservation, transport and chain-of-custody procedures and accompanying safety protocols are in the AAM SOPs. General safety procedures for field staff are contained in AAM SOP Section 18.

Section 7

LABORATORY PARAMETERS AND PROTOCOLS

7.1 $PM_{2.5}$ Filter Analysis

$PM_{2.5}$ filters will be weighed by a contract laboratory (CL) using a microbalance. Field operators will submit the air volume and elapsed time during sampling to the CL. The CL will calculate the resulting $PM_{2.5}$ concentrations (in units of micrograms per cubic meter) and submit them to KDHE on a monthly basis. The CL will follow 40 CFR Part 50 and U.S. EPA Quality Assurance Guidance Document 2.12 (or equivalent, as approved by KDHE/BAR) in all of its activities. KDHE will conduct an annual laboratory inspection according to AAM SOP Section 9. Sample holding times and description of laboratory analytical and safety protocols will be included in the CL QAPP. The CL QAPP will be reviewed and approved by the air monitoring supervisor, the bureau quality assurance representative, and the Monitoring and Planning Section chief.

7.2 PM_{10} Filter Analysis

PM_{10} and TSP filters will be weighed by the KDHE Division of Health and Environment Laboratory (DHEL). Field operators will submit the air flow rate and elapsed time during sampling to DHEL. DHEL will calculate the resulting PM_{10} concentrations (in units of micrograms per cubic meter) and submit them to the Monitoring and Planning Section on a monthly basis. Sample holding times and description of laboratory analytical and safety protocols will be included in the DHEL QAPP.

Section 8

DATA VALIDATION AND MANAGEMENT

This section provides a description of data validation, storage, transfer, reporting and backup requirements and special documentation requirements.

8.1 Data Validation

Data validation involves using procedures to check that field and data processing operations have been carried out correctly. The data validation process finds data that are suspect. Then the verification process determines whether the data are valid, invalid, or valid with a flag. A more detailed description of the data validation procedures shown below can be found in Section 4 of the AAM SOP.

8.1.1 $PM_{2.5}$ Filter Monitoring

Operators send electronic downloaded filter and interval data to the Planning and Data Unit (PDU). In the PDU, these data are visually compared to the last transmittal to see if there are any missing data. If there are missing data, the operator is contacted to find out why and to take any corrective action. The volume, elapsed time, and flow rate are looked at to see if they are reasonable. The site IDs are checked. The status codes should be 00000000 unless the sample was a field blank in which case the status codes are 00800000. The filter data are checked visually for unusual values and any duplicate filter IDs. If there are any problems, the operator is contacted in order to determine the validity or take corrective action.

Downloaded interval data are also visually checked. Interval data have the ambient temperature, filter temperature, barometric pressure, and flow rate for every five minutes. This check, points out any flows which are off by 5 percent for a five minute period. These $PM_{2.5}$ concentrations are flagged by a W in the submittal to EPA-AQS. There is an exception to this. If the monitor was put into audit mode (this would be indicated in the status codes and corroborated by QC records) during the sample day, this would cause a flow to be off by five percent. This would not cause a flag since it is not a malfunction of the monitor and does not introduce any error into the sample volume. The program also checks for any cases where the filter temperatures are higher than the ambient temperatures by five (5) degrees C average for a period of 30 minutes. These $PM_{2.5}$ concentrations are flagged by an X in EPA-AQS. Where the temperature differences occur on non-sampling days, there would be no flag if the filter had been removed prior to the temperature difference.

The contract laboratory assigns flags to $PM_{2.5}$ data which are independent of the AQS flags described above. These flags are described in the AAM SOP Appendix E.

8.1.2 PM_{10} Intermittent Monitoring

The field operators send in the filters with flow rate, elapsed time, the date, and the monitor ID. The PDU check these entries to see if they are reasonable. PM_{10} concentrations are sent by the Division of Health and Environmental Laboratories (DHEL) to the Monitoring and Planning Section (MPS). The PDU personnel check for any unusual values. Upon request of the MPS, DHEL then checks these unusual values for data entry errors.

8.1.3 Continuous (Gaseous and PM) Monitoring

Continuous data is recorded by the data loggers every hour. A field staff member visually scans the data for unusual values. He/she investigates these to determine if they are valid. The field staff member checks any missing data to see if it should really be invalid. He/she may know why the data is missing or he/she can check the flag assigned to the data to see if it is reasonable. When corrections are needed, the field staff member submits the corrections to the Data Manager (DM) in writing. After a quarter of data has been checked on the data computer, an AQS-format file is generated in EDAS that is then saved into the DailyData folder in Datamon. Once the file is in this location it is ready to be retrieved by the DM for submission to EPA through AQS.

Normally, the field staff member disables the data logger channel when doing a quality control (QC) operation on a monitor. A primary concern is that the field staff member might not disable the data logger channel and outlier data would be recorded in the data logger. The DM investigates all hourly data for such outlier data. If outlier values are found, the DM will check the date and time of these values versus the date of each QC operation recorded on the QA/QC Summary Table. If it is determined that a QC operation was being performed at the time the outlier data was recorded, the DM will investigate these values to determine whether they are valid or not.

8.1.4 Quality Control Data

The quality control data are entered by hand by the DM from field sheets into the AQSP&A program administered by EPA on a quarterly basis. Once all data has been entered, AQSP&A generates a report that can be run for both precision and accuracy data that highlights QC data that percent-difference values are higher than accepted for that particular pollutant by EPA.

When a QC operation is highlighted in this manner, the DM should review the original field sheet to determine if data has been entered correctly into AQSP&A. If information for the QC operation has been entered correctly, the DM should take the appropriate action in regards to the data in question. Once the reports for the appropriate calendar quarter have been reviewed and deemed correct, AQSP&A generates an AQS-format file for both precision and accuracy data that can then be submitted to EPA through AQS.

8.1.5 Submittal to EPA-AQS

Before any data can be submitted to EPA-AQS, an Edit/Load Summary and Edit Error Detail report are run on the data by an EPA program in preproduction status in AQS. Any suspect values or errors indicated by these reports are investigated and corrected if necessary. Also, a Scan Report and Statistical Evaluation are run in AQS. These functions show any unusual or high values that could be cause of further investigation. The Scan Report is needed because the AQS edit does not completely check non-criteria pollutants. Once the DM performs all the previously mentioned functions and determines that the data being submitted are valid, he/she can then post this data to productions status in AQS.

8.1.6 Ozone Mapping System (OMS)

Ozone and continuous $PM_{2.5}$ data are transmitted to the OMS on an hourly schedule for display on the EPA AIRNOW web page. These are raw data and not given the normal data validation review as described above. After receipt of OMS data, EPA conducts a series of QA/QC checks. The OMS data is subject to a disclaimer statement since the level of quality assurance is less rigorous than that applied to data posted to the AQS.

OMS data processing and management are generally accomplished via the Agilaire OMS module. This software package has been specifically designed and tested for preparation of OMS data.

8.2 Data Storage, Transfer, Reporting, Backup and Special Documentation

All the data are backed up on CD twice a week using Newtech Infosystems, Backup Now software. All the data are transmitted via the internet to AQS. Any data changes made to AQS are documented in a paper file in the office of the DM. All electronic data are archived on computer hard drive. Hard copy records are filed in the office for at least three years. After three years, they are transferred to the State of Kansas data archives. A more detailed description of the procedures shown below can be found in the AAM SOP Section 4.

8.2.1 $PM_{2.5}$ Intermittent Data

Downloaded monitor data is E-mailed or sent via diskette to the SQAR by the field staff. Each month these data are E-mailed by the SQAR to the contract laboratory (CL). Exposed filters are mailed by the field staff to the CL. After weighing the filters and calculating the concentrations, the CL sends the results to the SQAR and DM in electronic spread sheet format and AQS format. The CL calculates averages and standard deviations and sends the electronic spread sheets to the MPS personnel. The MPS is responsible for sending the CL results to the operators.

8.2.2 PM_{10} Intermittent Data

Envelopes (annotated with site ID, flow rate, elapsed time, the operator's initials, and the date of sampling) with enclosed filters are mailed (or hand-carried) by the operator to the MPS. These envelopes and filters are sent to the KDHE Division of Health and Environment Laboratories (DHEL). After weighing the filters and calculating the concentrations, the DHEL sends (via E-mail) the results to the DM.

8.2.3 Continuous Data

Data is automatically stored on a data logger at the site. The data computer in the MPS automatically polls the data loggers and stores the data on a daily basis. The data computer runs under the Agilaire Ambient Air Quality Data Acquisition Software (E-DAS). There may be some monitors that are not able to be polled. On these monitors, data is transmitted by E-mail or diskette. When a quarter of data has been loaded into E-DAS and reviewed by the operators, the monthly reports as generated by E-DAS are printed off by the DM and then reviewed for any unusual or erroneous values. After review, the DM performs any edits or voids in E-DAS that are needed.

8.2.4 Quality Control Data

QC data is entered into the AQSP&A program by hand by the DM from field sheets. AQSP&A saves these files as Excel files which can be read by any computer with the appropriate version of Microsoft Excel.

Section 9

EQUIPMENT CALIBRATION AND AUDITING

This section describes equipment testing, auditing, calibration, and preventive maintenance procedures. All actions performed according to this section will be recorded (as described in the AAM SOP) and submitted to the Data Manager on a quarterly basis.

9.1 $PM_{2.5}$ Intermittent Monitoring

The Streamline flow transfer standards will be calibrated annually according to AAM SOP Section 10. The temperature transfer standards will be calibrated according to AAM SOP Section 10. The barometric pressure transfer standards will be calibrated annually according to AAM SOP Section 10.

Monitor temperature sensors will be calibrated in the field initially and every 12 months following AAM SOP Section 9. Monitor temperature sensors will have a one point check (verification) every month following AAM SOP Section 9.

Monitor barometric pressure sensors will be calibrated in the field initially and every 12 months following AAM SOP Section 9. Monitor barometric pressure sensors will have a one point check (verification) every month following AAM SOP Section 9.

Monitor flow rate meters will be calibrated in the field initially and every 12 months following AAM SOP Section 9. Monitor flow rate meters will have a one point check (verification) every month following AAM SOP Section 9.

Monitor flow meters will be audited every six months following AAM SOP Section 9. Results of these audits will be submitted to EPA-AQS following AAM SOP Section 4. Whenever possible, audits should be performed by someone other than the regular site operator.

Preventive maintenance will be performed according to AAM SOP Section 9.

9.2 PM_{10} Intermittent Monitoring

The flow rate transfer standards (orifices) will be calibrated annually following AAM SOP Section 10. The monitor flow rates will be calibrated every 12 months following AAM SOP Section 2. 50% (a minimum of one) of the PM_{10} monitors will be audited each quarter.

All PM_{10} monitors will be audited every six months. All TSP monitors will be audited during the calendar year. Audits will be performed according to AAM SOP Section 2. Results of all

audits will be reported to EPA-AQS following AAM SOP Section 4. Whenever possible, audits should be performed by someone other than the regular site operator.

Preventive maintenance will be performed according to AAM SOP Section 2.

9.3 Continuous Gaseous Monitoring

9.3.1 Certification of Standards

Cylinders of known gas (CO and NO) will be traceable to either a National Institute of Standards and Technology (NIST) Traceable Reference Material (NTRM) or a NIST-certified Gas Manufacturer's Internal Standard (GMIS). This is done by using EPA Protocol Gases.

Permeation tubes used to obtain known gases will be traceable to either a NTRM or a NIST-certified GMIS. Traceability is certified according to EPA Traceability Protocol.

Ozone known concentrations are provided by Ultra-Violet (UV) photometers. A primary standard UV photometer is kept in the shop. Every 12 months, it is certified by comparing it to an EPA Region 7 UV photometer. Transfer standard UV photometers are used for quality control operations in the field. Whenever a transfer standard is used, it will have been certified against the primary standard within the previous three months.

More details on the certification of standards can be found in AAM SOP Section 10.

9.3.2 Calibrations

Calibration involves comparing the monitor to known concentrations of zero ppm, 0.03 to 0.08 ppm, 0.15 to 0.20 ppm, and 0.35 to 0.45 ppm (except CO, 3 to 8 ppm, 15 to 20 ppm, and 35 to 45 ppm). If necessary, adjustments are made for the zero point and the 35 to 45 ppm point. Calibrations are done initially and every six months after. When doing calibrations, AAM SOP Section 1 will be followed.

9.3.3 Zero and Span Checks

Zero and span checks (ZSC) are performed every two weeks according to AAM SOP Section 1. ZSC are used to validate data and, if needed, to adjust the monitors. The ZSC checks the monitor reading for a known of zero ppm and a known of 0.35 to 0.45 ppm (except CO 35 to 45 ppm). A span percent difference of greater than 25 percent causes data to the last valid span check to be invalidated. When a monitor runs for over five weeks without a ZSC or any quality control procedure, then the data since the last valid ZSC is invalidated.

9.3.4 Precision Check

Precision checks (PC) are performed every two weeks according to AAM SOP Section 1. PC are used as a check of the monitor at approximately the level of the National Ambient Air Quality Standard (NAAQS). PC are done prior to any adjustment of the monitor. PC are performed for a known of 0.08 to 0.10 ppm (except CO, 8 to 10 ppm). When doing PC, the known gases will pass through all filters, scrubbers, conditioners and other components used during normal sampling and as much of the ambient air inlet system as is practicable.

9.3.4 Audits

25% (a minimum of one) of the CO, 25% (a minimum of one) of the O3, 25% (a minimum of one) of SO_2, and 25% (a minimum of one) of the NO_2 monitors will be audited each calendar quarter. All monitors will be audited at least once during the calendar year. No adjustment will be made to the monitor on the same day prior to the audit. Audits will be performed following AAM SOP Section 1. Different known gases are used for the audit than for other quality control operations. The audit known gases are in the same concentration ranges as for calibrations (see section 9.3.2 above). Whenever possible, audits should be performed by someone other than the regular site operator.

9.3.5 Preventive Maintenance

Preventive maintenance is performed following AAM SOP Section 1.

9.4 $PM_{10}/PM_{2.5}$ Continuous Monitoring

9.4.1 Certification of Standards

The standard used for flow rate checks is the Dry Cal DC-2 Flow Calibrator manufactured by BIOS International Company. This is considered a primary standard. It is calibrated at the factory.

9.4.2 Calibrations

Calibrations will be performed initially and every six months following the AAM SOP Section 14.

9.4.3 Precision Checks

Precision checks (for flow) will be performed every two weeks following AAM SOP Section 14.

9.4.4 Audits

50 percent of the $PM_{10}/PM_{2.5}$ continuous monitors will be audited each calendar quarter. Each monitor will be audited with a single point flow check every 6 months. A different flow standard will be used for audits than is used for other quality control procedures. Audits will be performed following AAM SOP Section 14. Whenever possible, audits should be performed by someone other than the regular site operator.

9.4.5 Preventive Maintenance

Preventive maintenance will performed following AAM SOP Section 14.

Section 10

PURCHASED EQUIPMENT

10.1 Purchased Equipment

This section provides a description of inspection procedures and acceptance requirements for purchased equipment and supplies.

AAM SOP Section 12 will be followed.

Section 11

EVALUATION PROCEDURES

This section contains a description of procedures (including statistical procedures) used to evaluate data precision, accuracy, completeness, representativeness and comparability, including a detailed characterization of internal QC procedures and external performance audit requirements.

11.1 Calculation Procedures

Section 3 above contains the data performance criteria used for evaluation of data. Those criteria use the percent difference (PD) quite often. For precision calculations on collocated data (monitors located at the same site), the PD is found by the following formula:

$$PD = \frac{Y - X}{(Y+X)/2} \times 100$$

Where Y is the duplicate sampler concentration and X is the regular sampler concentration.

For all other calculations in section 3 above, the PD is found by the following formula:

$$PD = \frac{Y - X}{X} \times 100$$

Where Y is the known concentration (or flow) and X is the monitor concentration (or flow).

Percent completeness (PC) (criteria are described in section 3 above) is found by using the following formula:

$$PC = \frac{NV}{NT} \times 100$$

Where NV is the number of valid samples and NT is the number of theoretical (scheduled) samples.

11.2 Evaluation of Internal QC Activities

For precision and accuracy, evaluate the results following the procedures in section 3 above.

For zero/span checks, this procedure is followed:

(1) For a span absolute value of the percent difference (APD) of greater than 15 percent, perform a multi-point calibration of the monitor. For a span APD of greater than 25 percent invalidate data back to the last valid quality control activity.

(2) For an absolute value of the zero reading (AZR) greater than .025 ppm for all gases except CO, perform a multi-point calibration of the monitor. For an AZR of greater than 2.5 ppm for CO, perform a multi-point calibration of the monitor.

In cases where there are missing bi-weekly span checks, these validation rules will be followed:

(1) More than one span check missing, causes invalidation back to the last good (less than 16 percent difference) span check.

(2) A span check from 16-25 percent difference (with no recalibration), counts as missing.

(3) An audit or calibration (with the span point less than 16 percent difference) counts as a good span check.

(4) A good span check that is greater than 5 weeks after or before any other span checks does not validate any data.

11.3 Evaluation of External Audits

KDHE will participate in the National Performance Audit Program (NPAP) which is sponsored by EPA. $PM_{2.5}$ collocated Federal Reference Method (FRM) audits will be performed under NPAP; KDHE will cooperate with the auditors of this program. It is anticipated that EPA Region 7 will perform various monitor audits; KDHE will cooperate with these auditors, also. Any external audits with a percent difference greater than 15 percent (4 percent for $PM_{2.5}$ filter monitor flow audit and 10 percent for PM_{10} filter monitor flow audit) will be investigated to find the problem. Corrective action will be taken to solve the problem.

Section 12

SPECIAL TREATMENT OF DATA

12.1 Special Treatment of Data

This section describes procedures used to evaluate and enhance utility of environmental monitoring data including, but not necessarily limited to, procedures and assumptions applied in the identification and treatment of (a) outliers and other anomalous data, (b) nonlinear data requiring statistical transformation, and (c) values reported as "less than" or "greater than" established reporting limits**.**

In those cases where filter net weights are less than zero, these samples are considered invalid.

In those cases where continuous monitors record concentrations less than zero, these concentrations are reported as zero.

Except for the above, there will be no other special treatment of data.

Section 13

CORRECTIVE ACTIONS

13.1 Corrective Actions

Section 13 of the Ambient Air Monitoring Standard Operating Procedures (AAM SOP) describes corrective actions that are taken due to problems including quality control results which indicate problems as described in sections 8, 9, and 11 above.

Section 14

QUALITY OF ACQUIRED DATA

14.1 Quality of Acquired Data

This section describes procedures for determining the quality of ancillary data acquired from external sources not subject to the provisions of the KDHE Division of Environment Quality Management Plan (e.g., meteorological, hydrological, geological, chemical and/or biological data obtained from other state and federal agencies).

The Monitoring and Planning Section acquires meteorological data (MD) from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC). The data acquired are the unedited local climatological data**.**

The MD are used to correlate air quality pollution data with source emission data. The MD are also used to analyze long range transport of air pollution. The MD are also used to convert PM_{10} or $PM_{2.5}$ concentrations reported in standard conditions of temperature and pressure to concentrations reported in local conditions of temperature and pressure. Details of this procedure are in Section 4 of AAM SOP.

The NCDC estimate that the MD have an error rate of less than one percent.

Section 15

REPORTS

15.1 Reports

This section contains a description of program/project deliverables (electronic databases, summary statistics, illustrative materials, interim and final reports, etc.) and schedule for completion.

Hourly and daily concentration data are reported to the EPA Air Quality System (AQS) on a quarterly basis. A calendar quarter's data is submitted within 90 days of the end of the quarter. Before the data are accepted by AQS, a statistical critical review (Stats CR) scan report and statistical evaluation must be performed. The EPA program SCAN is also run in order to verify the data further. Prior to any submission of concentration data to AQS, all applicable monitor and site information is submitted to AQS.

Precision and accuracy data are reported to the EPA AQS on a quarterly basis. A calendar quarter's data is submitted within 90 days of the end of the quarter. An EPA edit has to be passed before the data are accepted by AQS.

A SLAMS annual report is submitted to EPA Region 7 and EPA Headquarters. This report covers the calendar year and is submitted by 1 July (1 May starting in 2010) the following year. This report gives a summary of SLAMS, $PM_{2.5}$ and PM_{10} monitoring data.

An ambient air monitoring network report is submitted to EPA Region 7 by 30 June of each year. This report provides the results of a network review and what changes are planned in the immediate future.

A Kansas air quality report will be published each year. This report provides information to the general public on air pollution activities and trends. This report is targeted to be completed by 30 September of each year.

A quality assurance program evaluation of the air monitoring program is conducted covering the calendar year. This report is submitted to the Division of Environment QA Officer by 15 February of each year. The Monitoring and Planning Section Chief directs this evaluation.

During the ozone season, ozone monitoring data (i.e., “fast track” data, not completely quality assured) are submitted to EPA. The data are submitted to EPA Region VII on a weekly basis.

As short term special projects are completed, a project report is prepared that summarizes the activities and results of the air monitoring of the project.

For those ozone monitors that report real-time data to the ozone mapping system (OMS), data is automatically transmitted to OMS during the ozone season (April 1 through October 31). Polling times for OMS are 7 a.m., 11 a.m., 1 p.m., 3 p.m., 5 p.m., 7 p.m., and 9 p.m. Central Standard Time (CST). These data are not quality assured.

Section 16

TRAINING

16.1 Training

Personnel will meet the educational, work experience, responsibility, and training requirements for their positions. Records on personnel qualifications and training will be maintained in personnel files.

On-the-job training is an important part of the training program. For this, an employee reads and studies all relevant material (e.g., operator's manual, SOPs, federal regulations, and QA manuals) before performing an operation. Then the employee performs the operation while being observed by an experienced field staff member. When the experienced field staff member is satisfied that the employee is doing the operation correctly, the employee then may do the operation independently. More detailed training procedures are given in Section 5 of AAM SOP.

Any conferences or workshops on air monitoring will be attended if funding can be arranged. Usually only one person attends these (he/she relays the information to applicable personnel after returning to the office) in order to conserve resources.

Over the years, a number of courses have been developed for personnel involved with ambient air monitoring and quality assurance aspects. Formal QA/QC training is offered through the following organizations:

- Air Pollution Training Institute (APTI) *http://www.epa.gov/oar/oaq.apti.html*
- Air & Waste Management Association (AWMA) *http://awma.org/epr.htm*
- American Society for Quality Control (ASQC) *http://www.asqc.org/products/educat.html*
- EPA Institute
- EPA Quality Assurance Division (QAD) *http://es.inel.gov/ncerqa/qa/*
- EPA Regional Offices